Fact Sheet for General Permit For Open-Loop Geothermal Well Systems And The Discharge To The Ground From Such Systems

INTRODUCTION

Pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, s. 26-53, and the Ground Water Discharge Permitting Program Regulations, 314 CMR 5.00 (the "Ground Water Regulations"), the Department of Environmental Protection (the "Department" or "MassDEP") is issuing a general permit (the "General Permit") for open-loop geothermal well systems that withdraw water from the ground so that it may be used for heating and/or cooling and thereafter returned to the ground and the discharge to the ground from such systems, This fact sheet provides the principal facts and the significant legal and policy questions considered in the development of the General Permit for such facilities.

COVERAGE OF GENERAL PERMITS

The Ground Water Regulations, 314 CMR 5.00, establish the program whereby discharges of pollutants to the ground waters of the Commonwealth are regulated by MassDEP pursuant to the Massachusetts Clean Waters Act, M.G.L c.21, s. 43. In addition to regulating these discharges, the Massachusetts Clean Waters Act, M.G.L. c.21, s. 26 through 53, also requires that MassDEP regulate the outlets for such discharges and any treatment works associated with these discharges. Through the Ground Water Regulations, 314 CMR 5.00, MassDEP regulates the discharge of pollutants to the ground waters of the Commonwealth to protect these ground waters for use as an actual or potential drinking water source and surface waters for their existing and designated uses and to assure the attainment and maintenance of the Surface Water Quality Standards, 314 CMR 4.00.

The Ground Water Regulations, 314 CMR 5.13, authorize the issuance of general permits to one or more categories or subcategories of discharges. Pursuant to 314 CMR 5.13, MassDEP may issue a single general permit to a category of facilities whose discharges warrant similar pollution control measures because they:

1. Involve the same or substantially similar types of operations;
2. Discharge the same types of wastes;
3. Require the same effluent limitations or operating conditions;
4. Require the same or similar monitoring requirements; and
5. In the opinion of the Department, are more appropriately controlled under a general permit than under individual permits.

BASIS FOR THE GENERAL PERMIT

Based on the factors set forth above, MassDEP hereby issue this General Permit. For the purposes of this General Permit, an open-loop geothermal system is a heating and/or air conditioning system that uses the earth's ability to store heat in the ground and water thermal masses by pulling water directly from the ground into a heat pump, where heat is either extracted or added. The water is then returned to the earth via the same well(s) or other nearby well(s). These facilities generally involve the same types or substantially similar types of operation and discharge the same type of wastes. As a result, these facilities require the same type of effluent limitations, operating conditions and monitoring requirements.

MassDEP has determined that operation of such facilities in accordance with all the terms and conditions set forth in the General Permit protects the ground water as a potential source of drinking water and surface waters for their existing and designated uses. By granting coverage under the General Permit to such facilities, the Department can devote less time to permit issuance and more time to monitoring permit compliance. MassDEP has therefore concluded that such facilities are more adequately controlled under the General Permit than an individual permit.

Eligibility

Facilities that discharge to the ground from open-loop geothermal well systems are eligible for coverage under the General Permit provided that:

- The discharge is from a facility that returns the ground water proposed to be used for heating and/or cooling to the same aquifer from which it was withdrawn. If the ground water proposed to be used for heating and cooling contains concentrations of any pollutants in excess of the water quality based effluent limits set forth in 314 CMR 5.10(3)(a), the discharge shall also return the ground water to the same subsurface unit within the aquifer from which the ground water is withdrawn.

- No additives are proposed to be applied to the ground water proposed to be used for heating and /or cooling and returned to the ground.

- The discharge is not in excess of 30 degrees Fahrenheit above or below the naturally occurring temperature of the receiving ground water.

- The well used to supply the ground water for heating and/or cooling is not used for any other purpose.

- The discharge is not located within

- The Zone I or Zone A of a public water supply;
- Fifty (50) feet of a wetland resource area;
- Fifty (50) feet of a surface water that is not a public water supply source;
- Fifty (50) feet of a watertight conduit which carries sewage or other wastes;
- Fifty (50) from any UIC Class V well not discharging sanitary or process wastewater;
- One hundred (100) feet from a subsurface sewage disposal system or other wastewater treatment facility with a discharge to the ground;
- One hundred (100) feet of a lagoon, livestock pen, or underground storage tank;
- One hundred (100) feet from a cold-water fishery;
- Ten (10) feet from a building; or
- Ten (10) feet from the property boundary.

- The discharger

  - Pursuant to 314 CMR 5.10(9), is not requesting effluent limits different from those in the General Permit; and

  - Has submitted a complete Notice of Intent requesting coverage under the General Permit.

Requirements for a Complete Notice of Intent Requesting Coverage Under the General Permit for Discharges to the Ground from Open-Loop Geothermal Well Systems

A complete Notice of Intent includes the following:

. 1. Legal name, address and telephone number of the person who will operate the open-loop geothermal system.

2. Legal name address and telephone number of the owner of the property on which the open-loop geothermal system is located.

3. Site address if different from above.

4. Legal name, address and telephone number of Massachusetts Registered Professional Engineer hired to prepare the Open-Loop Geothermal System Report.

5. Name, address and license number of MassDCR Licensed Well Driller.

6. Site contact person.

7. Documentation that public notice has been provided in accordance with 314 CMR 2.00 that the Department is considering whether to grant coverage under the General Permit.

8. Documentation that the applicant will not appeal a decision by the Department granting or denying coverage under the General Permit, and that if coverage is denied under the General Permit, and the applicant intends to proceed with the proposed discharge, the applicant will apply for an individual permit.

9, A Open-Loop Geothermal Well Evaluation Report (the “Geothermal Report”) prepared by a Massachusetts Registered Professional Engineer with a concentration in civil, sanitary or environmental engineering that contains the following information:

A copy of the applicable section of the MassGIS quadrangle map showing the location of the property boundary, and the proposed location of the geothermal well(s) or well field (indicating all intake and return wells if applicable) and all discharge locations (from return lines and if applicable bleeds) in relation to the following: private and public drinking water source; injection wells; lagoons; livestock pens; underground storage tanks; buildings; surface waters, including wetland resource areas, Outstanding Resource Waters designated in 314 CMR 4.00, Special Resource Waters designated in 314 CMR 4.00, bathing beaches as defined in 105 CMR 445.000, shellfish growing areas as defined in 314 CMR 9.02, cold-water fisheries as defined in 314 CMR 9.02, any surface waters listed on the most recent Integrated List of Impaired Waters, and any surface waters for which the Department has developed a Total Maximum Daily Load (TMDL).

A complete description of the site and the land uses proposed for the site including any and all Standard Industrial (SIC) Codes for such land uses. This description shall identify any areas on the site that are the location of land uses with higher potential pollutant loads as defined in 314 CMR 9.02. The site plan shall also identify the following: the site topography; the location and description of the site’s drinking water source; the location of any wells used for non-potable purposes; the location of all facilities for conveyance and treatment of sewage and other wastes including watertight conduits, wastewater treatment facilities, septic tanks, soil

absorption systems, and disposal areas; and the location of any injection wells, lagoons, livestock pens, underground storage tanks, and buildings.

A description of the site's geologic characteristics including the aquifer and subsurface unit from which the ground water is proposed to be withdrawn.

A description of the proposed open-loop geothermal well system, including maximum daily flow, average daily flow, well construction, well depth, estimated pressure, and safety features, including without limitation, automatic shutoffs activated by changes in pressure.

Design plans that identify the well and piping configuration including the taps for taking water quality samples of the ground water to be used for heating and cooling both before and after it is devoted to such use, flow metering locations for monitoring the volume of water withdrawn from the ground and returned to the ground, and automatic shutoffs devices activated by changes in pressure.

The estimated water balance for the withdrawal, re-injection and reject water (bleed) for both average operation and peak operation.

A description of the provisions to ensure that the ground water returned to the ground does not come to the surface or flood any subsurface structure in the immediate vicinity of the open-loop geothermal well system.

A list of the other permits needed for the open-loop geothermal system including any permits for the withdrawal of ground water, the return of the ground water, and the discharge of bleed off water along with information detailing the status of each required permit.[1]

A sampling plan that includes the following:

A plan for sampling the ground water proposed to be used for heating and/or cooling to determine whether it contains

[1] If bleed off water is proposed to be discharged to a surface water, an NPDES permit is required. If bleed-off water is discharged is to a wetland resource area, or if the withdrawal will affect a wetland resource area, an Order of Conditions under the Wetlands Protection Act is required. If the discharge is to a wastewater collection system that transports wastewater to a publicly owned treatment works, a sewer connection permit is required. If the discharge is to a municipal separate storm sewer system, documentation that the operator of the system will allow the discharge is required. Contaminated ground water may not be discharged to a municipal separate storm sewer system or other stormwater management system.

pollutants in excess of the water quality based effluent limits set forth in 314 CMR 5.10(3); and

A plan for sampling all return lines and bleed lines included in the open-loop geothermal system to ensure that they are properly disinfected after installation.

The Sampling Plan shall require that all sampling and analysis be conducted in accordance with methods approved by 40 Code of Federal Regulations Part 136 or alternative methods approved by the Department. The plans shall call for the sampling to take place after the system has withdrawn at least three borehole volumes of water from the ground. Samples shall be analyzed by a laboratory certified for that parameter by the Department, or if no such laboratory is available, a laboratory certified by EPA.

A certification by the Registered Professional Engineer that the information set forth in the Geothermal Report is true, accurate, and complete and that construction and operation of the proposed open-loop geothermal system as set forth in the Geothermal Report will enable the system to operate in compliance with all the terms and conditions of the General Permit.

10. The permit application fee; and

11. The signature of a person specified in 314 CMR 5.14 along with the certification required by 314 CMR 5.14.

The Notice of Intent requesting coverage under the General Permit must be sent to the Regional Office that issues permits for discharges located within the municipality where the permittee's discharge is located by certified mail return receipt requested. A copy of the Notice of Intent must be sent to the Program Director, Watershed Permitting, Department of Environmental Protection, One Winter Street, 5th Floor, Boston, MA 02108.

The person requesting coverage under the General Permit is authorized to construct the facility shown on the site plan in accordance with the General Permit within forty-five (45) days of receipt of the Notice of Intent by the Department unless s/he is notified by the Department in writing that additional information is required to determine whether the proposed discharge may be adequately or appropriately covered under the General Permit and/or that s/he is required to apply for an individual permit or to request coverage under an alternative general permit.

CONDITIONS OF THE GENERAL PERMIT

A. Statutory and Regulatory Requirements

The Massachusetts Clean Waters Act makes it unlawful to discharge pollutants without a permit.

For dischargers not requesting special effluent limits in accordance with 314 CMR 5.10(9), the Ground Water Regulations, 314 CMR 5.10, provide that permits for the discharge to the ground of effluent from an open-loop geothermal well system shall require the effluent to meet the more stringent of the water quality based effluent limitations defined in 314 CMR 5.10(3) and the technology based effluent limitations defined in 314 CMR 5.10(4). To assess compliance with these limits, the Ground Water Discharge Permits issued by the Department identify certain parameters that MassDEP uses to monitor compliance with the more stringent of the water quality based limits and the technology based limits. MassDEP establishes effluent limits for those parameters in accordance with 314 CMR 5.10(3) and (4), and lists these limits as special conditions in its permits. Applying this approach to the category of discharges eligible for coverage under the General Permit, the Department has determined that effluent limits for the following parameters shall be listed as special conditions in the General Permit: flow, temperature, pH, and specific conductance. The permit also provides that the effluent shall not contain a visible oil sheen.

MONITORING AND REPORTING REQUIREMENTS

The dischargers covered by the General Permit are required to submit to MassDEP a quarterly discharge monitoring report (DMR) containing effluent data.

FINANCIAL ASSURANCE MECHANISM REQUIREMENTS

If the open-loop geothermal well system is privately owned, the Ground Water Regulations, 314 CMR 5.10(7A)(1) and 314 CMR 5.15, provide that the permittee shall establish and maintain a financial assurance mechanism that provides for an immediate repair and replacement account. If the system serves at least some residential uses, the permittee shall also establish a financial assurance mechanism that provides for a capital reserve account. Consistent with these regulatory provisions, the General Permit provides that if the open-loop geothermal system is privately owned, the permittee shall establish the required financial assurance mechanism(s).

TERM OF THE PERMIT

The General Permit is in effect for a period of five years from the date of issuance.